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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/036,391	01/07/2002	Stefan Schabel	Q67746	4486

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EXAMINER	
DSOUZA, JOSEPH FRANCIS A	
ART UNIT	**PAPER NUMBER**
2611	

DATE MAILED: 09/06/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/036,391	SCHABEL ET AL.	
	Examiner	Art Unit	
	Adolf DSouza	2611	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *21 June 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

Response to Arguments

1. Changes to the title have been accepted by the Examiner.

2. Applicant's arguments, see Remarks, page 3, filed June 21, 2006, with respect to the rejection of Claim 1 under 35 USC § 112 have been fully considered and are persuasive. The rejection of Claim 1 has been withdrawn.

3. Applicant's arguments filed June 21, 2006, with respect to the rejection of Claim 1 under 35 USC § 103(a) have been fully considered but they are not persuasive.

Applicant has stated that (a) Hansryd fails to disclose that the bandwidth is 0.2% to 0.4% of the bit timing (Remarks, page 4, last 2 paragraphs), (b) Hansryd's bandpass filter has a Q of 1800 and a bandwidth of 5.5 MHz with a which results in 0.055% of his bit timing, whereas the Applicant uses a bandpass filter with a Q value between 300 and 400 (Remarks, page 5, 1st paragraph).

Examiner would first like to point out that the value of 0.055% calculated by the Applicant is incorrect. As shown on page 4, 2nd paragraph of the specification, the percentage is a percentage of the bit rate. The correct bit rate to be used in the calculation is 40 Gbps, not 10 Gbps, because of the x4-MUX shown in Fig. 2 of Hansryd. Therefore the correct percentage is 0.013%.

Examiner argues that even though the numbers above, for Hansryd, are different from the Applicant's numbers, the concept used is the same. Hansryd has a 40 Gbps data

stream going through the bandpass filter whereas the Applicant has a 10Gbps data stream. Therefore the period of Hansryd's data stream is 25ps whereas the Applicant's is 100ps. Since the period is much smaller in Hansryd's case, he has to have an RMS jitter that is much smaller. This means that the Q of Hansryd's filter has to be larger than in the Applicant's case, where a larger jitter is tolerable and a smaller Q can be used. Hansryd discloses in Figs. 4 and 5 how the RMS jitter increases as the Q is reduced. Therefore, Examiner argues that the concept is the same and the choice of Q (or filter bandwidth) is merely a design parameter based on the bit rate and the desired RMS jitter. One of ordinary skill in the art can easily take Hansryd's example and modify it for a different bit rate.

Applicant has also stated that Andrews does not disclose that the "transient recovery time is less than the time by which signals are delayed on the delay path which in turn is less than the decay time" (Remarks, page 6). Andrews discloses a delay element that is used to match the delay in paths 16 and 18 (Fig. 1; column 3, line 62 – column 4, line 33). Andrews does not explicitly disclose that what the lower and upper bounds of that delay are. One of ordinary skill in the art knows that the signal in the delay path can't be delayed arbitrarily and can easily compute the delay in path 16 and then derive lower and upper bounds on how much to delay the signal in path 18 to match the delay in path 16. These lower and upper bound would correspond to the transient recovery time and the decay time. Therefor, Examiner contends that even though Andrews states that the delay element provides a matched delay, and does not specify the exact lower and

upper bound on the delay provided by the delay circuit 26, one of ordinary skill in the art knows how to calculate these when computing the "matched delay".

Priority

4. Acknowledgment is made of applicant's claim for foreign priority under 35 U.S.C. 119(a)-(d).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Prior to rejection of claims, the examiner would like to bring to the applicant's attention that there is no specific description of the function of the discriminator in the specification. Therefore, in the absence of such a description, the examiner has interpreted the discriminator in the broadest possible terms and claims are analyzed in light of that broad interpretation.

7. Claims 1-2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hansryd (A Simple, Low Timing Jitter, Sub-Multiple Clock Recovery Scheme, Sept. 20-24, 1998, European Conference on Optical Communication, pages 471-472) in view of Andrews et al. (US 4715049).

Regarding claim 1, Hansryd discloses process for digital message transmission in a packet mode (page 471, section "Introduction", 1st 4 lines; wherein the packet mode is interpreted as the time division multiplexing scheme), where transmitted signals are sampled at an end of a transmission link by means of a device for timing recovery (Fig. 2, page 471, section "Experimental Details") and are then further processed;
and where the signals are fed to a discriminator simultaneously via two separate paths (Fig. 2, element "Demux"; wherein the discriminator is interpreted as the demux), a delay path (Fig. 2, fiber delay line path labeled 40 Gbits/sec; page 471, section "Experimental Details") and a path fitted with a filter (Fig. 2, element "High-Q filter"; section "Experimental Details");

a wideband bandpass filter with a relative bandwidth of 0.2% to 0.4% of a bit timing of the transmitted signals is used as the filter (Fig. 2, element "High-Q filter"; section "Experimental Details"; also see "Response to Arguments" above).

and an amplifier limiting an amplitude of an output voltage of the limiting amplifier via which the signals are brought to a required constant level, is connected downstream of

the bandpass filter (Fig. 2, element "Limiting amplifier"; page 471, 2nd column, last line - page 472, 1st 3 lines).

Hansryd does not disclose the relationship between the transient recovery time, the delay time and the decay times.

In the same field of endeavor, however, Andrews discloses transient recovery time is less than a time by which the signals are delayed on the delay path, and the time by which signals are delayed on the delay path is less than a decay time of the wideband bandpass filter (Fig. 1. element 26; column 3, line 62 – column 4, line 33; wherein the time by which the signals are delayed on the delay path in relation to the transient and decay times is interpreted as being the delay set by delay element 26).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Andrews, in the system of Hansryd because this would allow the delay to be adjusted so that the signals in both paths are synchronized.

Claim 2 is similarly analyzed as the limitation in claim 1, that the bandwidth be 0.2% – 0.4% of the bit rate.

Regarding claim 6, Hansryd discloses an optical telecommunication system for the transmission of optical data packets (page 471, left column, 1st 3 lines; wherein the packet mode is interpreted as the time division multiplexing scheme).

All other limitations of claim 6 are apparatus limitations corresponding to method limitations in claim 1 and recite substantially very similar limitations and therefore are similarly analyzed as method claim 1 above.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hansryd (A Simple, Low Timing Jitter, Sub-Multiple Clock Recovery Scheme, Sept. 20-24, 1998, European Conference on Optical Communication, pages 471-472) in view of Andrews et al. (US 4715049) and further in view of Haykin (Communication Systems, 1978,John Wiley & Sons, pages 89-93).

Regarding claim 3, Hansryd does not disclose that the bandpass filter can be implemented by in-phase and quadrature paths comprising low pass filters.

In the same field of endeavor, however, Haykin discloses a circuit with two parallel paths in which each is an identical low-pass filter arranged between two analogue multipliers, is used as the bandpass filter (Figs. 1.48 (a) and (b); page 89, section 1.15; wherein the output of (a) is fed to the input of (b) to give the desired configuration);

and a local timing is applied to the multipliers of one of the two parallel paths, while the local timing shifted by 90.degree. is applied to the multipliers of the other one of the two parallel paths (Figs. 1.48 (a) and (b); page 89, section 1.15; wherein the local timing is interpreted as the "cos" signal and the local timing phase shifted by 90-degrees is interpreted as the "sin" signal).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Haykin, in the system of Hansryd because this would allow the bandpass filter to be implemented by in-phase and quadrature paths that use low pass filters, thereby simplifying and cost reducing the implementation.

9. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hansryd (A Simple, Low Timing Jitter, Sub-Multiple Clock Recovery Scheme, Sept. 20-24, 1998, European Conference on Optical Communication, pages 471-472) in view of Andrews et al. (US 4715049) and further in view of Haykin (Communication Systems, 1978,John Wiley & Sons, pages 89-93) and Malik et al. (US 5,577,056).

Regarding claim 4, Hansryd does not disclose that a sample-and-hold element is placed before the low-pass filters.

In the same field of endeavor, however, Malik discloses a system that utilizes a sample-and-hold circuit in the two parallel paths of a timing recovery scheme (Fig. 2, elements 44 and 45; column 4, lines 57-59; wherein the sample-and-hold elements are interpreted as the A/D converters).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Malik, in the system of Hansryd because this would allow digital processing of the elements of the bandpass filter, thereby improving system reliability, since the filter parameters wouldn't be subject to temperature and time fluctuations and also the two paths could be more precisely matched.

10. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hansryd (A Simple, Low Timing Jitter, Sub-Multiple Clock Recovery Scheme, Sept. 20-24, 1998, European Conference on Optical Communication, pages 471-472) in view of Andrews et al. (US 4715049) and further in view of Pachynski (US 4,025,720).

Regarding claim 5, Hansryd does not disclose converting NRZ code to RZ code.

In the same field of endeavor, however, Pachynski discloses coding of the signals prior to the bandpass filter is converted from an NRZ code to an RZ code (column 5, lines 27-34; column 7, lines 52-65).

Therefore it would be obvious to one of ordinary skill in the art, at the time the invention was made, to use the method, as taught by Pachynski, in the system of Hansryd because this would produce a spectral component for clock recovery.

Other Prior Art Cited

11. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

The following patents cited to further show the state of the art with respect to clock recovery in general:

Bench et al. (US 4,276,651) discloses clock circuitry for a data communication system.

Cortese (US 5,138,633) discloses method and apparatus for adaptively retiming and regenerating digital pulse signals.

Meline (US 5,047,735) discloses RZ clock recovery circuit with positive feedback.

Pearson (US 5276712) discloses method and apparatus for clock recovery in digital communication systems.

Thomas et al. (US 4,996,444) discloses a clock recovery circuit.

Viola et al (US 4,737,970) discloses a clock recovery circuit using a cavity resonator.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Adolf DSouza whose telephone number is 571-272-1043. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:00 PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mohammad Ghayour can be reached on 571-272-3021. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Adolf DSouza
Examiner
Art Unit 2611

AD

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